

REMARKS

Initially, applicant would like to thank the Examiner for the helpful and courteous telephonic interview he conducted with applicant's undersigned representative on August 25, 2005. A set of proposed claim amendments provided to the Examiner prior to the telephone interview were discussed in view of Castro (US 5, 464,246) and Decomps (US 6,692,020). The Examiner indicate that the proposed amendments did not avoid rejection in view of Castro, since in a broad interpretation of Castro, the whole inflated airbag can be considered to be "a protruding portion". To avoid rejection in view of Castro, the Examiner suggested that language be included in the proposed claim which recites that "when the airbag is in the folded state," the protrusion extends laterally outward from the seat. This feature is not disclosed or suggest in the cited prior art.

Upon entry of the present Amendment-A the claims in the application are claims 1-22, of which claims 1 and 11 are independent. Claims 1, 3, 11 and 13 are amended herein, and new claims 21-24 are added.

Applicant respectfully submits that all of such amendments are fully supported by the original disclosure, including the drawings. Applicant also respectfully submits that the amendments do not raise any new issues for consideration by the Examiner or introduce any impermissible "new matter" into the application.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment is submitted. It is contended that by the present amendment, all bases of objection and rejection set forth in the Office Action have been traversed and/or overcome. Accordingly, reconsideration and withdrawal of the objection(s) and

rejection(s) are respectfully requested.

In the Specification:

Objections to the Specification

The specification was objected to by the Examiner because a substantial duplicate of page 6 was included with the original specification. The substantially-duplicate page was identical to page 6 (first occurrence) except for paragraph numbering. In addition, the paragraphs numbers provided on page 7 were non-sequential with the paragraph numbers of page 6 (first occurrence). A substitute specification with markings to show all changes has been provided herein, in which the duplicate page is deleted, and the paragraph numbers on page 7 are corrected to provide numbers which are sequential with those of page 6. A clean version (without markings) of the substitute specification is also provided. The substitute specification includes no new matter.

In the Claims:

Claim Rejections – 35 USC 102

At item 5 of the Office Action, the Examiner rejected claims 1-9 and 11-19 under 35 USC 102(b) as being anticipated by Castro et al. US 5,464,246. In the rejection, the Examiner states that Castro discloses an airbag device including an airbag 130 folded along sides of a seat back and cushion, and which is adapted to be expanded by gas generated by an inflator (col. 2, lines 52-55), the airbag disposed outside a lap belt of a seat belt (Fig. 2c). The Examiner states that the device includes an airbag cover (col. 5, lines 61-62, "protective sleeve") which is disposed at least partially within the seat (Fig. 2d), and includes a protrusion portion disposed outside of the seat, wherein the lap belt extends between the protrusion and the seat. The Examiner further states that the airbag extends from an upper

end of the seat to a front end of the cushion, the cover between the seat back and the cushion is inherently flexible, and no portion of the airbag is between the seat belt and the occupant.

Applicant's Response:

Upon careful consideration of the rejection and the cited references, the applicant agrees that, as broadly claimed, the cited prior art anticipates the claimed invention. However, the airbag device disclosed by Castro is clearly different than that of the applicant. In particular, Castro does not provide a portion of the airbag which protrudes from the seat to encircle an outward-facing portion of the lap belt whereby it is ensured that the seatbelt does not interfere with inflation of the airbag. For example, the "protrusion" of Castro's device, as cited by the Examiner in the Office Action, simply corresponds to an exposed portion of the airbag at the location where it transitions from the being housed within the seat back to being housing within the seat cushion. Moreover, the applicant submits that a reasonable interpretation of the term protrusion could not include the airbag as a whole. That is, a protruding portion is generally understood to mean a portion of the airbag protruding with respect to other portions of the airbag. However, the airbag disclosed by Castro is of uniform diameter throughout, with no bumps, knobs, or other non-uniformities extending outwardly from the exterior surface.

In contrast to the airbag disclosed by Castro, the inventive air bag disclosed by the applicant resides, in a folded state, in parallel with the lateral side surface of the seat, even at the transition between the seat cushion and the seat back, except at the location of the protrusion. Specifically, the applicant's airbag protrudes laterally outward along a side of the seat cushion at a location spaced apart from the seat back to partially encircle a portion of the lap belt.

The applicant has amended independent claims 1 and 11 herein to more clearly define the applicant's invention. In particular, claims 1 and 11 now recite that "the air bag comprises a protruding portion in the folded state, the protruding portion extending laterally outward from a side of a seat cushion so that the protruding portion is disposed outside a lap belt of a seat belt device provided with the seat." This feature is not disclosed or suggested in the prior art.

At item 6 of the Office Action, the Examiner rejected claims 1 and 11 as being anticipated by Decamps et al. (US 6,692,020). The Examiner states that Decamps discloses an airbag device comprising an airbag 40 accommodated in a folded state along the sides of the seat back and seat cushion of a seat (Fig. 1) and adapted to be expanded by gas generated by an inflator upon side collision of a vehicle, and to be deployed between an inner surface of a side of a vehicle compartment and the occupant, wherein the airbag is disposed outside a lap belt 32 of a seat belt (Fig. 1).

Applicant's Response:

The applicant respectfully disagrees with this rejection. Upon careful consideration of the reference, the applicant submits that Decamps does not disclose every claimed feature of the invention. In particular, with reference to Fig. 1 of Decamps, it is clear that the airbag 40 in the folded state does not extend along a side of the seat back or the seat cushion, as recited in this claim. Although the folded airbag of Decamps is draped to extend vertically adjacent to the side of the seat cushion, it does not extend along (ie along the entire length of) the seat cushion, and is not located in the vicinity of the seat back.

The airbag device disclosed by Decomps is clearly different than that of the applicant. For example, with reference to Fig. 1 of Decomps, it is clear that the airbag does not extend between the vehicle structure (end 44, col. 3, line 9-10) and the top of the seat back, and again, no portion of Decomps' airbag is actually disposed along a side of a seat back, as recited in claim 1. Moreover, Decomps does not disclose an airbag cover or a protrusion.

Although the applicant disagrees with this rejection, as discussed above, the applicant has amended independent claims 1 and 11 herein to more clearly define the applicant's invention. In particular, claims 1 and 11 now recite that "the air bag comprises a protruding portion in the folded state, the protruding portion extending laterally outward from a side of a seat cushion so that the protruding portion is disposed outside a lap belt of a seat belt device provided with the seat." This feature is not disclosed or suggested by Decomps.

At item 8 of the Office Action, the Examiner rejected claims 10 and 20 as being unpatentable over Castro et al. in view of Ikeda (JP 10-129412). The Examiner states that Castro fails to disclose the lap belt extending through a bore in the seat, but that Ikeda teaches a seat with a bore A through which the lap belt 3 passes (Fig. 2), and that it would have been obvious to modify Castro by the teachings of Ikeda in order to assure that the belt would not interfere with the airbag.

Applicant's Response:

While the applicant agrees that Ikeda (English language translation of the abstract) discloses a seat with a bore A through which the lap belt passes, the applicant respectfully

does not agree that it would have been obvious to modify invention of Castro to include a lap belt which extends through a bore in the seat, since Castro does not discuss the seat belt system, and since Ikeda does not disclose a preferred location of the bore with respect to an airbag. The applicant respectfully suggests that the Examiner appears to be using improper hindsight reasoning to formulate this rejection, since the reason provided for the modification is not suggested by either of the cited references, but instead comes from the applicant's disclosure. Moreover, the applicant notes that claims 10 and 20 depend (indirectly) from claims 1 and 11. Thus, the amendments to claims 1 and 11 herein, which avoid rejection in view of the cited prior art, also permit claims 10 and 20 to avoid rejection.

Other Matters

New claims are added to the application herein. New claim 21, which depends from claim 1, and new claim 23, which depends from claim 11, each recite that the protrusion is a generally U-shaped portion lying in a horizontal plane, the lap belt extending within the space formed by the legs and base of the U. New claim 22, which depends from claim 1, and new claim 24, which depends from claim 11, each recite that the airbag includes both transition portion, and a protrusion spaced apart from the transition portion.

The features recited in these new claims are not disclosed or suggested in the cited prior art references, or by any combination thereof. The new claims are fully supported in the specification, including the drawings, and no new matter as added.

Conclusion

In conclusion, applicant has overcome the Examiner's objection and rejections as presented in the Office Action; and moreover, applicant has considered all of the references of record, and it is respectfully submitted that the invention as defined by each of the present claims is clearly patentably distinct thereover.

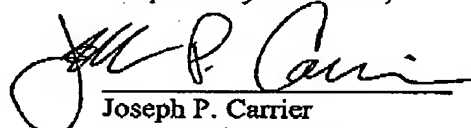
The application is now believed to be in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner is not fully convinced of all of the claims now in the application, applicant respectfully requests that the Examiner telephonically contact applicant's undersigned representative to expeditiously resolve prosecution of the application.

The Commissioner is hereby authorized to charge the \$120.00 fee for an extension for response, within one month, and is also authorized to charge any deficiency or credit any excess, to Deposit Account 50-0744 in the name of Carrier, Blackman & Associates, P.C. JPC

Favorable consideration is respectfully requested.

Respectfully submitted,

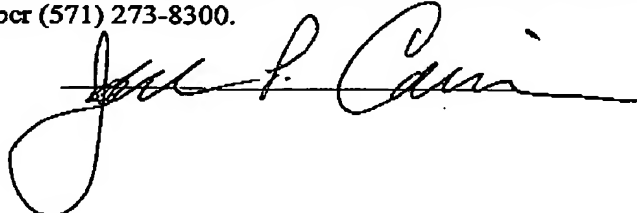

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being transmitted, via facsimile, to Examining Group 3616 of the United States Patent and Trademark Office on September 14, 2005, at the number (571) 273-8300.

JPC/kmm



APPENDIX: SUBSTITUTE SPECIFICATION

Part One: Marked-up Version Showing Changes

SIDE AIR BAG DEVICE

BACKGROUND OF THE INVENTION

1. TECHNICAL FIELD TO WHICH THE PRESENT INVENTION BELONGS

[001] The present invention relates to a side air bag device comprising an air bag which is accommodated in a folded state along sides of a seat back and a seat cushion of a seat for an occupant and which is adapted to be expanded by a gas generated by an inflator upon side collision of a vehicle to be deployed between an inner surface of a side of a vehicle compartment and the occupant.

2. DISCUSSION OF RELEVANT ART

[002] A conventional side air bag device is known, for example, from US Patent No. 5,464,246. An air bag of this side air bag device is formed cylindrically and adapted to be deployed to connect an upper end of a seat back and a front end of a seat cushion, thereby restraining from a side of the breast to a side of the waist of an occupant.

[003] When both a side air bag device and a seat belt device are mounted in a seat, if the air bag is deployed to connect an upper end of a seat back and a front end of a seat cushion, there is a possibility that the air bag is sandwiched between an occupant and a lap belt disposed to restrain the waist and the abdomen of an occupant, whereby the smooth deployment of the air bag is obstructed and a shock-absorbing effect cannot be effectively exhibited.

SUMMARY OF THE INVENTION

[004] The present invention has been accomplished with such circumstance in view, and it is an object of the present invention to prevent the deployment of the air bag of the side air bag device from being obstructed by the interference of the air bag with the lap belt of the seat belt device.

[005] To achieve the above object, according to an aspect of the present invention, there is proposed an air bag device comprising an air bag which is accommodated in a folded state along sides of a seat back and a seat cushion of a seat for an occupant and which is adapted to be expanded by a gas generated by an inflator upon side collision of a vehicle to be deployed between an inner surface of a side of a vehicle compartment and the occupant, wherein the air bag is disposed outside a lap belt of a seat belt device provided with the seat.

[006] With the above arrangement, the air bag of the air bag device is disposed outside the lap belt of the seat belt device, and hence the air bag can be deployed from the sides of the seat back and the seat cushion without interfering with the lap belt, so that a shock-absorbing effect can be effectively exhibited.

[007] A front seat 11 in each embodiment corresponds to the seat in the present invention.

[008] Other objects, advantages and salient features of the invention will be apparent from the following detailed description which, in conjunction with the annexed drawings, discloses the present embodiments of the invention.

BRIEF DESCRIPTION OF DRAWINGS

[009] Fig.1 is a perspective view of a front seat equipped with a side

air bag device according to a first embodiment of the invention.

[010] Fig.2 is a view taken in a direction of an arrow 2 in Fig.1.

[011] Fig.3 is a view taken in a direction of an arrow 3 in Fig.2.

[012] Fig.4 is an enlarged sectional view taken along a line 4-4 in Fig.2.

[013] Fig.5 is an enlarged sectional view taken along a line 5-5 in Fig.2.

[014] Fig.6 is an exploded perspective view of an air bag module in Fig. 1.

[015] Fig.7 is a view similar to Fig.1, but according to a second embodiment of the present invention.

[016] Fig.8 is a view similar to Fig.1, but according to a third embodiment of the present invention.

DETAILED DESCRIPTION THE INVENTION

[017] Modes for carrying out the present invention will now be described by way of embodiments of the present invention with reference to the accompanying drawings.

[018] Figs.1 to 6 show a first embodiment of the present invention.

[019] A side air bag device is disposed along a right side of a front seat 11 of an automobile, namely, along a face opposed to a front door or a center pillar. The side air bag device includes an air bag module 14 embedded in right sides of a seat back 12 and seat cushion 13. The air bag module 14 comprises: an inflator 15 adapted to generate a high-pressure gas; an air bag 16 adapted to be expanded by the gas generated by the inflator 15 to be deployed to connect an upper end of the seat back 12 and

a front end of the seat cushion 13; and an air bag cover 17 in which the air bag 16 in a folded state is accommodated. The air bag cover 17 formed cylindrically from a thin synthetic resin includes: a first accommodating portion 18 embedded in the seat back 12; a second accommodating portion 19 embedded in the seat cushion 13; and a bellows portion 20 which connects the first accommodating portion 18 and the second accommodating portion 19 to each other and which is capable of being bent during reclining. Slits 17a for breaking the air bag cover 17 in a lengthwise direction are formed in the first and second accommodating portions 18 and 19 and the bellows portion 20.

[020]

The air bag cover 17 of the above-described structure is embedded inside sewn portions 22 of skins 21, 21 of the seat back 12 and the seat cushion 13. A protrusion 19a is formed on the second accommodating portion 19 of the air bag cover 17 in the vicinity of the bellows portion 20, and exposed to the outside from a side of the seat cushion 13. Tear lines 13b liable to be broken are formed on the seat cushion 13 to connect the sewn portions 22 of the skins 21, 21 of the seat cushion 13 to edges surrounding the protrusion 19a of the air bag cover 17. The tear lines 13b may be formed by partially thinning the skin 21 of the seat cushion 13, by making perforations, or by sewing the seat cushion 13 by an easily breakable thread.

[021]

A seat belt device 26 includes a lap belt 27 for restraining the abdomen of an occupant, and a shoulder belt 28 for restraining the breast of the occupant. The lap belt 27 is fixed at one end to a lap belt anchor 30 mounted on one of seat frames 29. One

end of the shoulder belt 28 is slidably passed through a slip ring 31 mounted at an upper portion of the center pillar 23, and is wound around a retractor 32 mounted at a lower portion of the center pillar 23. A tongue 33, through which the other ends of the lap belt 27 and the shoulder belt 28 are slidably passed, is detachably locked on a buckle 35 mounted on the other seat frame 34. The one end of the lap belt 27 extending from the lap belt anchor 30 is passed upwards from below through a gap between the seat cushion 13 and the protrusion 19a of the air bag cover 17 protruding outwards from the seat cushion 13. Through such construction, the folded air bag 16 is disposed outside the lap belt 27, or in other words, no portion of the air bag 16 is disposed between the occupant and the lap belt.

[022]

When an acceleration equal to or higher than a predetermined value is detected as a result of side collision of a vehicle including the side air bag device of the above-described structure, the air bag 16 supplied with the high-pressure gas generated by the inflator 15 is expanded within the air bag cover 17, and the resultant pressure breaks the air bag cover 17 along the slits 17a. Further, the sewn portions 22 of the skins 21, 21 of the front seat 11 and the tear lines 13b are broken, and the resultant openings allow the air bag 16 to deploy while connecting the upper end of the seat back 12 to the front end of the seat cushion 13, thereby restraining the right side of an occupant to protect the occupant from a shock resulting from the side collision. At this time, the lap belt 27 extending vertically from the lap belt anchor 30 of the seat belt device 26 is in

abutment against the right part of waist of the occupant, but the protrusion 19a of the air bag cover 17 accommodating the air bag 16 in this area detours around outside the lap belt 27. Therefore, the air bag 16 is prevented from deploying between the lap belt 27 and the occupant, that is, the air bag 16 reliably deploys while avoiding the interference with lap belt 27.

[023] A second embodiment of the present invention will now be described with reference to Fig.7.

[024] In the first embodiment, the lap belt 27 is disposed outside the lap belt 27 in such a manner that the protrusion 19a provided on the second accommodating portion 19 of the air bag cover 17 detours around the outside the lap belt 27. In the second embodiment, however, a second accommodating portion 19 of an air bag cover 17 is formed rectilinearly, the entire air bag module is embedded in the seat cushion 13, and the lap belt 27 is guided to above the seat cushion 13 through a lap belt-insertion bore 13a formed in the seat cushion 13 at a location inside the second accommodating portion 19.

[025] Also according to the second embodiment, the air bag 16 is disposed outside the lap belt 27 to be reliably deployed while avoiding the interference with the lap belt 27.

[026] A third embodiment of the present invention will now be described with reference to Fig.8.

[027] The third embodiment is an improvement of the first embodiment. In the third embodiment, the second accommodating portion 19 of the air bag cover 17 is partially exposed from a right side of the seat cushion 13 at the protrusion 19a rather

~~6~~

~~abutment against the right part of waist of the occupant, but the protrusion 19a of the air bag cover 17 accommodating the air bag 16 in this area detours around outside the lap belt 27. Therefore, the air bag 16 is prevented from deploying between the lap belt 27 and the occupant, that is, the air bag 16 reliably deploys while avoiding the interference with lap belt 27.~~

~~[028] A second embodiment of the present invention will now be described with reference to Fig. 7.~~

~~[029] In the first embodiment, the lap belt 27 is disposed outside the lap belt 27 in such a manner that the protrusion 19a provided on the second accommodating portion 19 of the air bag cover 17 detours around the outside the lap belt 27. In the second embodiment, however, a second accommodating portion 19 of an air bag cover 17 is formed rectilinearly, the entire air bag module is embedded in the seat cushion 13, and the lap belt 27 is guided to above the seat cushion 13 through a lap belt insertion bore 13a formed in the seat cushion 13 at a location inside the second accommodating portion 19.~~

~~[030] Also according to the second embodiment, the air bag 16 is disposed outside the lap belt 27 to be reliably deployed while avoiding the interference with the lap belt 27.~~

~~[031] A third embodiment of the present invention will now be described with reference to Fig. 8.~~

~~[032] The third embodiment is an improvement of the first embodiment. In the third embodiment, the second accommodating portion 19 of the air bag cover 17 is partially exposed from a right side of the seat cushion 13 at the protrusion 19a rather~~

than being embedded in the seat cushion 13, and, as in the first embodiment, one end of the lap belt 27 is passed upwards from below through the gap between the protrusion 19a of the air bag cover 17 protruding outwards and the seat cushion 13. A cover 36 for covering a reclining mechanism (not shown) provided on a right side of the seat cushion 13 covers the second accommodating portion 19 of the air bag cover 17.

~~[033]~~
[0028]

Therefore, when the air bag 16 is expanded so that the air bag cover 17 is broken along the slits 17a (see Figs. 4-5), a portion of the air bag 16 within the first accommodating portion 18 is deployed while breaking the sewn portion 22 of the seat back 12, but a portion of the air bag within the second accommodating portion 19 is deployed from a gap between the side of the seat cushion 13 and the cover 36 for the reclining mechanism. According to the third embodiment, the protrusion 19a of the air bag cover 17 is completely covered with the cover 36 so as to be invisible from outside, leading to an improvement in appearance.

~~[034]~~
[0029]

Although the embodiments of the present invention have been described in detail, it will be understood that various modifications may be made without departing from the subject matter of the present invention.

~~[035]~~
[0030]

For example, in the third embodiment, the air bag 16 may be deployed from the opening of a tear line formed in the cover 36 due to the pressure caused by the expansion of the air bag 16, rather than deploying the air bag 16 from the gap between the side of the seat cushion 13 and the cover 36 of the reclining mechanism.

~~[036]~~
[0031]

As discussed above, according to the present invention,

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the air bag of the air bag device is disposed outside the lap belt of the seat belt device, and hence the air bag can be deployed from the sides of the seat back and the seat cushion without interfering with the lap belt, so that a shock-absorbing effect can be effectively exhibited.